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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,164	04/13/2004	Manimaran Muthiah	10013.0005US	3738

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EXAMINER

VAINBERG, SIMON

ART UNIT	PAPER NUMBER
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1797

MAIL DATE	DELIVERY MODE
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12/10/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.	Applicant(s)	
10/823,164	MUTHIAH ET AL.	
Examiner	Art Unit	
Simon Vainberg	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 23-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 8, 9 and 12-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 07/26/2007
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Applicant's amendment of claims 1 and 16 is acknowledged and has been entered.
2. Applicant's cancellation of claims 5-7 and 10 and 11 is acknowledged and has been entered.
3. Applicant's withdrawn of claims 23-31 is acknowledged and has been entered.
4. Applicant's amendment to the specification at paragraphs (0050) and (0076) is acknowledged and has been entered.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1- 4, 8, 9 and 12- 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parce et al. (US Patent 5942443) in view of Austin et al. (US Patent 5837115).

Regarding claim 1, the Parce et al. (US Patent 5942443) reference teaches a device comprising: at least two channels being separated by a partitioning wall therebetween (see Fig. 6A, channels 634 and 604), wherein each channel has an inlet and an outlet (Fig. 6A numbers 650 and 652), and at least one through passage is defined in the partitioning wall to allow fluid communication between the two channels (see Fig. 6A, channels 634 and 604 are interconnected by channel 636).

The Parce et al. reference also teaches that at least two passages are defined in each of the at least one partitioning wall (see Fig. 6A, channels 634 and 604 and interconnected channels 636 and 638).

The Parce et al. reference further teaches that the partitioning wall comprises: two wall sections separated by a gap therebetween; and at least one partitioning element in the gap that divides the gap to form the two passages (see attached Fig. 6A, where A and C are two wall sections separated by gap between them and B is

partitioning element in the gap that divides the gap to form the two passages 644 and 642).

The Parce et al. reference further teaches a that the partitioning wall comprises at least two partitioning elements that divide the gap into at least three passages (see attached Fig.6A, where A and D are two wall sections separated by gap between them and B and C are two partitioning elements that divide the gap into three passages 644, 642 and 640).

The Parce et al. reference does not teach that partitioning elements are unevenly spaced apart to form passages of widths that vary along the length of the partitioning wall and the widths of the passages increases along the length of the partitioning wall.

Austin et al. teaches the sorting apparatus for studying the migration of the cells (see Abstract), wherein the obstacles can have a staggered pattern, or any desired predetermined and reproducible pattern (see column 10 lines 40-45 and lines 59-66). According to Fig.3 number 39, "obstacles" are considered the same as "partitioning elements". Each of the obstacles is separated from an adjacent obstacle by a predetermined separation distance (see column 10 lines 52 and 53) to form passages. These dimensions can be changed and designed to be as desired (see column 10 lines 59-66) to form the passages of a different width inherently including the passages wherein the widths of the passages are increased along the length of the partitioning wall.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teaching of Parce et al. by arranging the partitioning

elements in any desired predetermined pattern and changing the separation distance between the obstacles as taught by reference Austin et al. because such modification would allow one to use this device for studying of migration of cells of different shapes and sizes.

Regarding claim 2, the Parce et al. and Austin et al. references teach a device according to claim 1 comprising three channels and two partitioning walls, each of which separates two neighboring channels being separated by a partitioning wall therebetween (see the Parce reference, Fig. 6A, channels 634, 604 and 606).

Regarding claim 3, the Parce et al. and Austin et al. references teach a device according to claim 1, comprising n channels and $n-1$ partitioning walls, each of which separates two neighboring channels (see the Parce reference Fig. 6A, channels 634 and 604 and partitioning wall between them).

Regarding claim 4, the Parce et al. and Austin et al. references teach a device according to claim 2, wherein the channels lie in a common place (see the Parce reference column 24, claim 22, lines 4-6).

Regarding claim 8, the Parce et al. and Austin et al. references teach a device according to claim 7, wherein the partitioning wall comprises m partitioning elements that divide the gap into at least $m+1$ passages (see attached Fig.6A of the Parce reference, where, for example, A and E references are the wall sections separated by a gap between them and B, C and D references are three partitioning elements that divide the gap into four passages 644, 642, 640 and 638).



Regarding claim 9, the Parce et al. and Austin et al. references teach a device according to claim 7, wherein the partitioning elements are at least substantially evenly spaced apart to form passages of at least substantially equal widths (see attached Fig.6A of the Parce reference, where, for example, A and E references are the wall sections separated by a gap between them and B, C and D references are three partitioning elements that evenly spaced apart to form four passages 644, 642, 640 and 638 of equal widths).

Regarding claim 12, the Parcel et al. and Austin et al. references teach the claimed invention according to claim 7 wherein the partitioning elements have one of semi-circular, circular, polygonal and an elongated cross section.

Austin et al. teaches that the shapes of the obstacles may vary (see column 14 lines 7-8).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Parcel et al. by fabricating the partitioning elements according to any predetermined shape as taught by Austin et al. because that would allow one to study the migration of the cells of different shapes and sizes.

Regarding claim 13, the Parce et al. and Austin et al. references teach the claimed invention according to claim 12 wherein the elongated cross-section is rounded at least one end thereof.

Austin et al. teaches that the shapes of the obstacles may vary (see column 14 lines 7-8).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Parce et al. by fabricating an elongated cross-section of rounded shape as taught by reference Austin et al. because that would allow one to study the movement of the specific cells.

Regarding claim 14, the Parce and Austin et al. references teach a device according to claim 2, wherein the thickness of at least one of the partitioning walls is different than that of the other partitioning walls (see the Parce reference, Fig.3, where the thickness of the one of the partitioning wall between channels 304 and 306 is different than the

thickness of the other partitioning wall between channels 306 and 308).

Regarding claim 15, the Parce et al. and Austin et al. references teach a device according to claim 14, wherein the thicknesses of the partitioning walls are different from each other (see the Parce reference, Fig.3, where the thickness of the one of the partitioning wall between channels 304 and 306 is different than the thickness of the other partitioning wall between channels 306 and 308).

Regarding claim 16, the Parce et al. and Austin et al. references teach a device according to claim 1, wherein the device comprises a substrate whose surface has grooves that define the at least two channels and at least one passage; and a cover that is attached to the surface of the substrate (see the Parce reference, column 9 lines 8 - 15 and column 19 lines 6-14).

Regarding claim 17, the Parce et al. and Austin et al. references teach a device according to claim 16, wherein the substrate is molded using a biocompatible material (see the Parce reference, column 8 lines 13-23).

Regarding claim 18, the Parce et al. and Austin et al. references teach a device according to claim 17, wherein the biocompatible material is at least substantially translucent.

The Parce reference teaches a transparent material (see column 8 lines 27-36), which is inherently translucent.

Regarding claim 19, the Parce et al. and Austin et al. references teach a device according to claim 16, wherein the cover is of a biocompatible material.

The Parce reference teaches a cover fabricated from the glass (see column 9 lines 11-15), which is considered to be a biocompatible material.

Regarding claim 20, the Parce et al. and Austin et al. references teach a device according to claim 19, wherein the biocompatible material is at least substantially translucent.

The Parce reference teaches a cover fabricated from the glass (see column 9 lines 11-15), which is considered to be to be a translucent material.

Regarding claim 21, the Parce et al. and Austin et al. references teach a device according to claim 17, wherein the biocompatible material comprises one of glass, silicon and a polymerizable material (see the Parce reference, column 8, lines 2i-23).

Regarding claim 22, the Parce et al. and Austin et al. references teach a device according to claim 21, wherein the polymerizable material is comprises a material selected from the group consisting of polycarbonate (monomer), polyacrylic (monomer), polyoxymethylene (monomer), polyamide (monomer), polybutylenterephthalate (monomer) and polyphenylenether (monomer), polydimethylsiloxane (PDMS) (monomer), mylar (monomer), polyurethane (monomer), polyvinylidene fluoride (PVDF) (monomer), flourosilicone (monomer) and combinations and mixtures thereof (see the Parce reference, column 8, lines 36-42).

Claim Objections

Claims 8, 9, 12 and 13 are objected as being of improper dependent form from canceled Claim 7.

Appropriate correction is required.

Response to Arguments

Applicant's arguments filed on 11/05/2007 have been fully considered but they are not persuasive.

1. Regarding the Applicant's statement that the presently claimed invention is drawn to devices for studying cell motility, migration and deformation while the Parce et al. (US Patent 5942443) and Austin et al. (US 5837115) devices are designed for the performing high-throughput screening assay of biochemical system (Parce et al.) and for fractionating microstructures such as free cells (Austin et al.) Examiner suggests that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex Parte Masham, 2 USPQ F. 2d 1647 (1987)*.

2. Regarding the Applicant's statement that Parce et al. (US Patent 5942443) and Austin et al. (US 5837115) does not teach that "the width of the passages increases along the length of the partitioning wall " (this limitation was claimed in a canceled claim 11 and is included in an amended claim 1), Examiner suggests that although Austin et al. does not teach directly that "the width of the passages increases along the length of the partitioning wall" Austin et al's invention indirectly teaches the same, based on the statement "that each of the obstacles 39 is separated from an adjacent obstacle 39 by a predetermined separation distance S_d " (see column 10 lines 52 and 53) to form passages. According to Fig. 3 number 39 of the Austin et al. reference "obstacles" are considered the same as "partitioning elements of partitioning wall". The Austin et al.

reference inherently indicates that width of the passages can be varied (such as increasing the width of the passage), based on the specific requirements of the fractioning experiment.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to fabricate the device wherein the width of the passages increases along the length of the partitioning wall, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Simon Vainberg whose telephone number is 571-270-3150. The examiner can normally be reached on Monday- Thursday 7:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SV


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SUPERVISORY PATENT EXAMINER